

**The effectiveness of some conventional and bio rational insecticides on the Maskell scale insect, *Insulaspis pallidula* (Green) on mango trees in Ismailia Governorate.**

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### ABSTRACT

An experiment was carried out at the 2<sup>nd</sup> of January, 2007 at Fayed district, Ismailia Government, to evaluate the effectiveness of some conventional insecticides, bio-pesticides and Mineral oils on the Maskell scale insect, *Insulaspis pallidula* (Green) infested Mango trees, *Mangifera indica* L. The obtained results obviously showed that Admiral was the most effective compound, which gave 83.35% percentage of reduction, followed by Biover (79.46%), Bioranza (78.88%), Conserve (73.96%) and Malathion (71.60%) reduction percentage. The least effective compound was Masrona oil which gave (68.52%) percentage of reduction.

### INTRODUCTION

Mango trees, *Manigifera indica* Linnaeus is considered one of the most popular fruits in the world countries in general and especially in Egypt. The mango fruits contain high percent of sugar, protein, vitamins, fats and salts. Mango fruits are important for food industry, such as juices, jams and marmalades. Mango are produced in more than 100 countries throughout both the tropics and subtropics countries and in many of these countries mango are produced as an export crop (Sauco, 1997). Egyptian mango fruits occupied economic importance in the world market for rich flavor and tasty.

Mango trees are subjected to infestation by several insects such as scale insects and mealybugs. These insects belonging to the superfamily coccoidea; Among of these scale insects is the Maskell scale insects, *Insulaspis pallidula* (Green) which causes severe damage to mango trees by sucking out the plant sap. This scale insect belonging to family Diaspididae, and it attacks leaves, shoots, twigs and fruits of mango trees. Severe infestation leads to yield drop (Elwan, "1990" and Kwaiz, 1999). Selim, "2002" and Elwan, "2005", which found that *I. pallidula* (Green) and *Aonidiella aurantii* (Mask.) attack mango trees. Also, they added that at high degree of infestation, these sucking insects cause serious damage to mango trees to leaves, branches and dropped fruits, leaves and dried branches. Nada *et al.*, (1990) tested the efficiency of Actellic 50% E.C., Anthio 33% E.C., Malathion 57% E.C., Selecron 72% E.C. and K.Z. oil against *Chloropulvinaria psidii*, *I. pallidula* and *Kilifia acuminata*. The results indicated that chemical control with organophosphorus or summer oil was more effective during spring than during winter. The present study was carried out to estimate the effectiveness of certain insecticides, bio-pesticides and mineral oils on the different stages of the Maskell scale insects, *I. pallidula* on mango trees in a private mango orchards at Fayed district, Ismailia Governorate.

## MATERIAL AND METHODS

An experiment was carried out at the 2<sup>nd</sup> of January, 2007 at Fayed district, Ismailia Governorate to study the efficiency of some bio pesticides such as Bioranza, Biover and Conserve; IGR as Admiral, Mineral oil as (Masrona oil) and Phosphorus insecticide such as (Malathion) on the Maskell scale insect, *Insulaspis pallidula* (Green), on mango tree *Manigefera indica* L. in Ismailia Governorate. The mango trees were kept free away from any insecticidal contamination throughout the last two years prior the experiment conduction. The tested treatments were randomizely distributed in complete random block design. Each treatment was replicated three times and each replicate contains three mango trees heavily infested with the Maskell scales insect, *I. pallidula* (Green).

By using six horse power motor sprayer (John Bean motor), the treated treatments were completely sprayed by the tested treatments. This motor has a tank with 600 liters. The spraying was conducted at pressure of two pounds per square inch. Each tree received 20-25 liters of the spraying solution to ensure complete covering of all tree parts. Random samples of 15 mango leaves heavily infested with the maskell scale insect , were picked up from each replicate before spraying application and one, two, three and four weeks after spraying application. The samples were kept in labeled paper bag with small holes and then transferred to the laboratory for examination by using binocular stereomicroscope. Alive preadults, Adult females, and Gravid females were counted and recorded per leaf. The reduction percentages of different stages of the maskell scale insect, *Insulaspis pallidula* (Green) were estimated according to the equation of Henderson and Tilton, (1955) as follows:

$$\text{Reduction Percentage} = 100 \left( 1 - \left( \frac{T a \times c b}{T b \times c a} \right) \right)$$

where :-

Ta = number of individuals in treated trees after treatment application

Tb = number of individuals in treated trees before treatment application

c a = number of individuals in control trees after treatment application

c b = number of individuals in control trees before treatment application

### The tested treatments:

Masrona oil ( Mineral oil) ( 2.5 liter/100 liter water) , Malathion 57% (Phosphorus compound) (100 cm<sup>3</sup>/100 liter water), Conserve 0.24 CB (0.02 w/w spinosad) (50 cm<sup>3</sup>/100 liter water) , Bioranza 10% WP (*Metarhizium anisopliae*) (200g/100 liter water), Biover 10% WP (*Beauveria bassiana*) (200g/100 liter water), and Admiral 10% EC (IGR, Pyriproxyfen) (50 cm<sup>3</sup>/100 liter water).

The obtained data were analyzed by using M state computer program software. When F values were significant means were separated by Fisher Least Significant Differences (LSD). At 0.05 level of significance. The aim of this work is to study the effectiveness of some conventional and biorational insecticides on the different stages of the Maskell scale insects on mango trees in Ismailia Governorate.

## RESULTS AND DISCUSSION

The obtained data of the effect of the tested compounds on the different stages of the Maskell scale insects in the whole period of the experiment and in the different post-treatments counts are tabulated in Table (1).

The obtained results of the whole period of the experiments, four weeks after spraying application clearly demonstrated that Pre adults was more susceptible to the all tested treatments than the Adult females and Gravid females of this scale insect. The percentages of reduction were 78.92%, 74.91% and 74.46% percentage of reduction for the Pre adults, Adult females and Gravid females of this scale insect, respectively.

The obtained data of the tested compounds were illustrated in Fig.(1) from the obtained results during the period of experiments, it could be concluded that Admiral was the most effective compound which gave 83.35% percentage of reduction of the different stages of the Maskell scale insect, *Insulaspis pallidula* (Green), followed by Biover, which gave 79.46%, Bioranza (78.88%), Conserve (73.96%) and Malathion (71.60%) reduction percentage, while the least effective treatment was Masrona oil which gave 68.52% percentages of reduction.

Table1: The reduction percentages of different stages of the Maskell scale insect , *I. Pallidula* (Green) by all the tested insecticides in the different post treatment counts of the experiment.

Post treatment counts	Reduction Percentages		
	Pre adults	Adult females	Gravid females
First	77.12	75.65	73.22
Second	78.89	74.25	74.96
Third	78.78	75.65	73.22
Fourth	80.93	74.08	76.44
The whole experiment	78.92	74.91	74.46

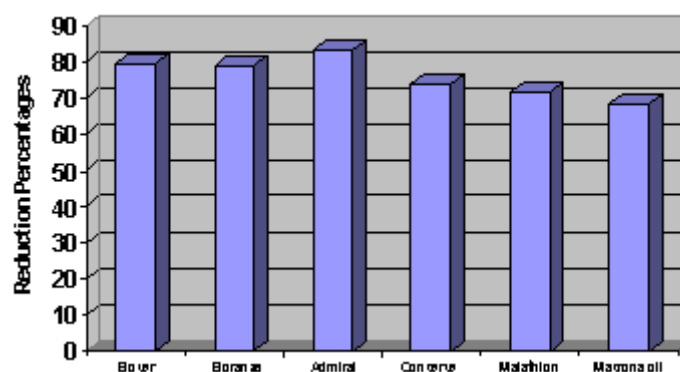


Fig. 1: Effects of some conventional and biorational insecticides on the different stages of the Maskell scale insect, *I. Pallidula* (Green) on mango trees at Fayed district, Ismailia Governorate.

In the first post-treatment count, one week after spraying application, Pre adults were the most susceptible stages to all tested treatments than Adult females and Gravid females of this scale insect. The mean percentages of reduction were 77.12%, 75.65% and 73.22% for Preadults, Adult females and Gravid females of this scale insect, respectively. The obtained data of the tested compounds were illustrated in Fig. (2). The obtained results clearly showed that Admiral (80.24%) was the most effective treatment on the different stage of the Maskell scale insect, followed by Malathion (77.93%), Biover (75.52%), Conserve (74.50%) and Bioranza (73.56%) percentages of reduction of this scale insets. The least effective treatment was Masrona oil (66.36%) reduction percentages of the different stages of this scale insect.

The obtained data in the second post-treatment count, two weeks after spraying application indicated that Pre adults as well as Adult females more susceptible than Gravid females of the Maskell scale insect. The percentages of reduction were 78.89%, 74.25% and 74.96% for the different stages of this scale insect, receptively.

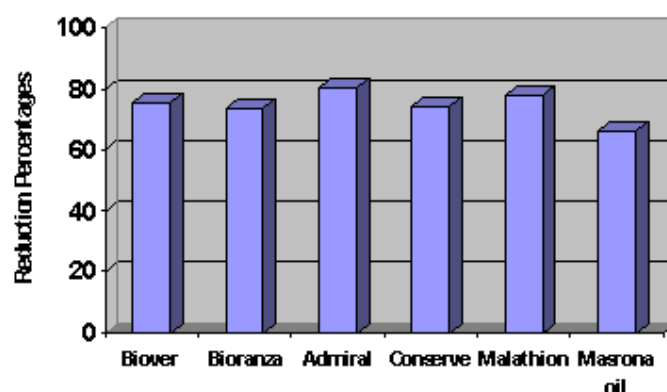


Fig. 2: Effects of some conventional and biorational insecticides on the different stages of the Maskell scale insect, *I. Pallidula* (Green) on mango trees after one week of application at Fayed district, Ismailia Governorate.

The obtained data of the tested materials in the second post-treatment count were illustrated in Fig.(3). The obtained data revealed that the tested treatments could be arranged descendigly as follows :- Admiral was the superior treatment (82.01%), followed by Biover (80.88%), Bioranza (77.51%), Conserve (75.72%) and Malathion (73.11%) percentage of reduction . The least effective treatment was Masrona oil (66.97%) percentage of reduction of this scale insect.

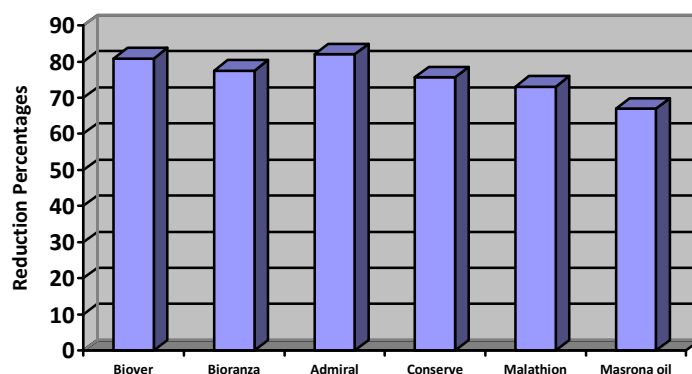


Fig. 3: Effects of some conventional and biorational insecticides on the different stages of the Maskell scale insect, *I. Pallidula* (Green) on mango trees after Two weeks of application at Fayed district, Ismailia Governorate.

Three week after spraying application, the third post- treatment count, data showed that Pre adults were more susceptible than Adult females and Gravid females of this scale insect. The reduction percentages were 78.78%, 75.65% and 73.22%, respectively. The obtained results of the tested insecticides in the third post-treatment count were illustrated in Fig. (4). The tested treatments gave satisfaction effect against the different stages of the Maskell scale insect, *I. pallidula* (Green). Admiral was the most effective treatments, followed by Bioranza, Biover, Conserve and Masrona oil. The reduction percentages were 84.07%, 80.89%, 79.86%, 71.56% and 70.74%, respectively; while the least effective treatment was Malathion where the reduction percentage was 68.73% of the different stages of the Maskell scale insect.

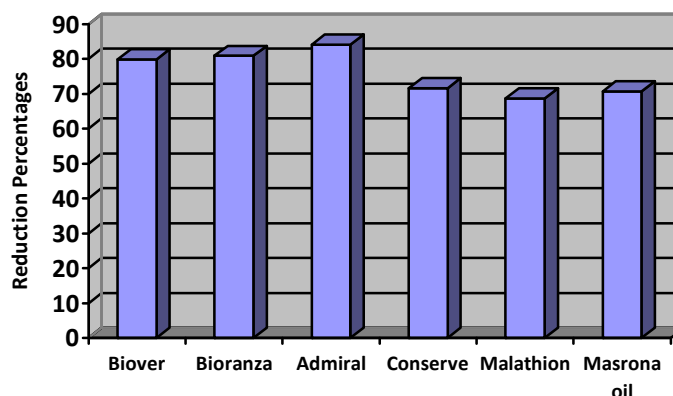


Fig. 4: Effects of some conventional and biorational insecticides on the different stages of the Maskell scale insect, *I. Pallidula* (Green) on mango trees after Three weeks of application at Fayed district, Ismailia Governorate.

Concerning the data of the fourth post spraying treatment count, four week after spraying application, data obviously showed that Gravid females and Adult females were the least responded stages for the tested treatments. The percentages of reduction were 80.92%, 76.44% and 74.08% for Pre adults, Adult females and Gravid females of this scale insect, respectively. The results of the tested compounds in the fourth post-treatment count were illustrated in Fig. (5). The obtained data revealed that Admiral was the highest effective treatment (87.08%), while Malathion was the least effective treatment (66.62%) percentage of reduction. The rest of the treatments could be arranged descendgly as follows: Bioranza (83.53%), Biover (81.57%), Conserve (74.06%) and Masrona oil (70.01%) percentage of reduction of the different stages of the Maskell scale insect.

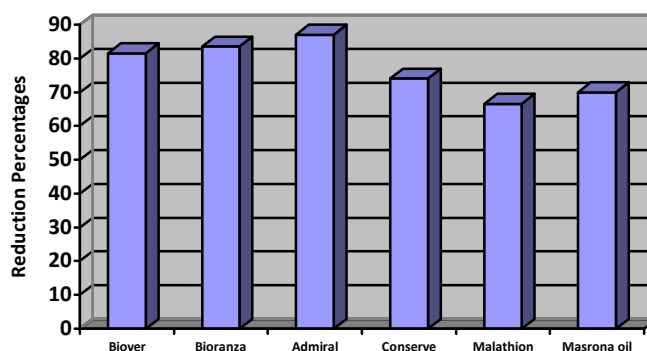


Fig. 5: Effects of some conventional and biorational insecticides on the different stages of the Maskell scale insect, *I. Pallidula* (Green) on mango trees after Four weeks of application at Fayed district, Ismailia Governorate.

These results are agree with Aleksidze et al., (1995) which mentioned that the application of mineral oil at the rate of 1.5% were effective against the overwintering stages. While the application of organophosphors or pyrethroid insecticides at the rate of (0.15%) were effective against the hatching crawlers. Also, Helmy *et al.*, (1997) noticed that Super Masrona oil gave a satisfactory initial effect on nymph (88.63%) and adult females (85.66%) of *A. aurantii* (Mask.) on sweet orange. Bakery, (2009) found that the tested treatments could be arranged according to their effectiveness against *I. pallidula* population in the following descending order:

Admiral was superior, followed by challenger, Biover and Bioranza, Chemi oil 2% and chemi oil 1%. Chemi oil was the least effective treatment even after duplicating its concentration.

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## ARABIC SUMMARY

دراسة كفاءة بعض المبيدات التقليدية والحيوية على حشرة المانجو المحارية (انسيولاسبس باليديولا) تحت الظروف البيئية في محافظة الإسماعيلية

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أجريت التجربة على أشجار المانجو المصابة بحشرة المانجو المحارية في منطقة فايد بمحافظة الإسماعيلية لتقييم بعض المبيدات التقليدية والمبيدات الحيوية والزيوت المعدنية. أظهرت النتائج المتحصل عليها أن منظم النمو أدميرال أعطى أعلى كفاءة في مقاومة الحشرة حيث أعطى 83.35% يليه المبيدات الحيوية بيوفا (79.46%)، بيورانزا (78.88%) ثم كونسيرف (73.96%) ثم المبيد الفوسفوري ملاثيون (71.60%). بينما أعطى الزيت المعدني مصرونا أويل أقل كفاءة ضد هذه الحشرة القشرية حيث أعطى 68.52% نسبة إبادة.